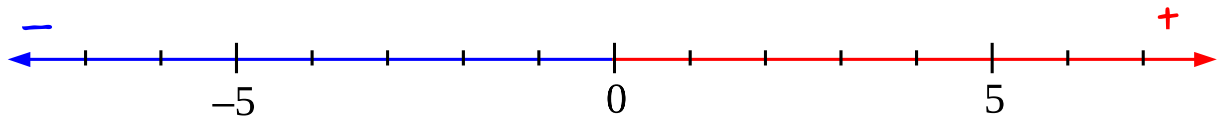
Lesson № 23

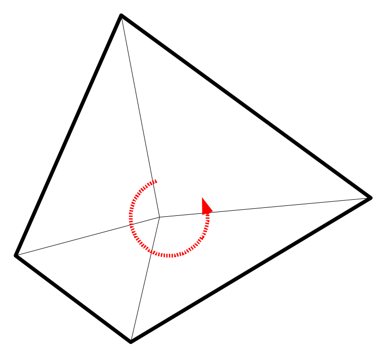
1 Calculate:



2 + 4 = 2 + (–4) = 2 – 4 = 2 – (–4) =

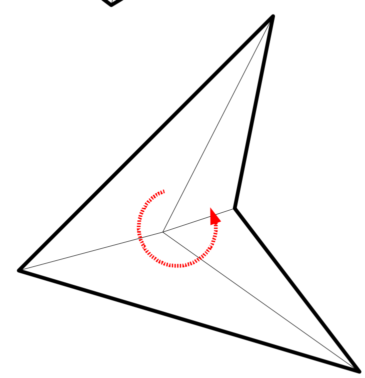
(–3) + 1 = (–3) + (–1) = (–3) – 1 = (–3) – (–1) =

Angle sum of a Quadrilateral.

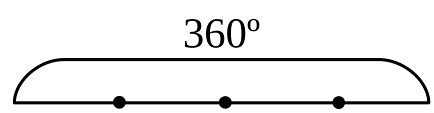


- Any quadrilateral can be split into four triangles
- Angle sum of each of these triangles equals 360°
- The angles of a quadrilateral are combinations of the angles of these four triangles (except the angles sharing the common vertex).
- These “inner” angles that add up to 360° must be subtracted

$$4 \times 180^\circ - 360^\circ = 360^\circ$$



2 **A.** Is it possible to have a quadrilateral with exactly 3 right angles?



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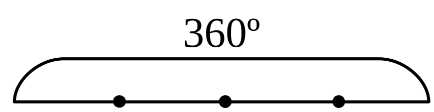
B. Three angles of a quadrilateral equal 75°, 90°, and 110°. What is the 4^{th} angle of the quadrilateral?



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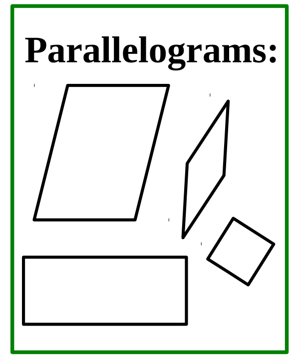
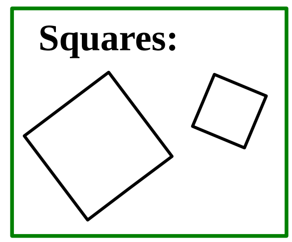
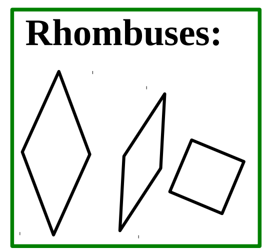
3 Draw a Venn diagram for:

- Square, Parallelogram, Rectangle



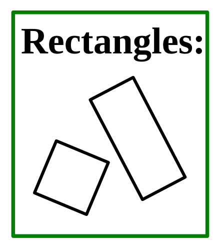
- Triangle, Parallelogram , Square, all shapes



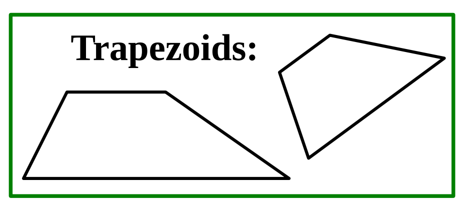


- Rectangle , Rhombus, Trapezoid, Parallelogram

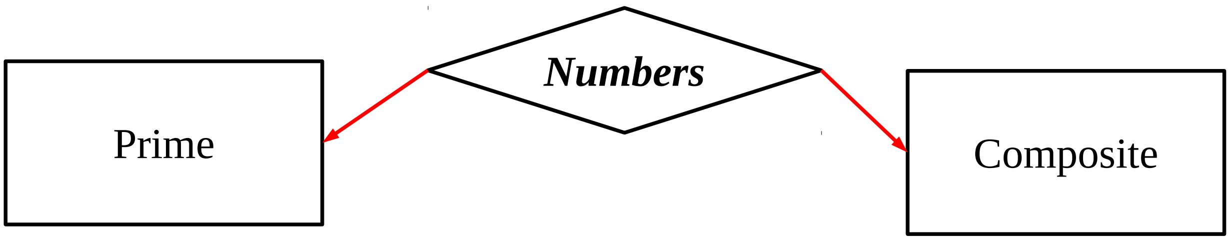
- Quadrilateral, Rectangle, Rhombus, Trapezoid, Parallelogram, Square



- Triangle, Parallelogram , Square, Circle, all shapes



Prime Numbers and Composite Numbers



Does not divide evenly by anything besides 1 and itself
3 = 3 × 1
5 = 5 × 1

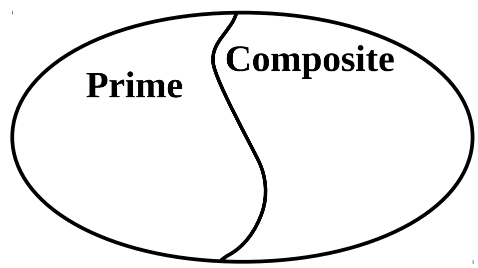
1 is neither a prime nor a compound number

Divides evenly **something** besides 1 and itself

6 = 2 × 3
12 = 6 × 2

Note, dividing evenly means **without** producing a remainder or a fraction!

4 Place the numbers from the set ***R*** into the Venn Diagram.



R = {2, 3, 4 5, 6, 7, 8, 9, 10}

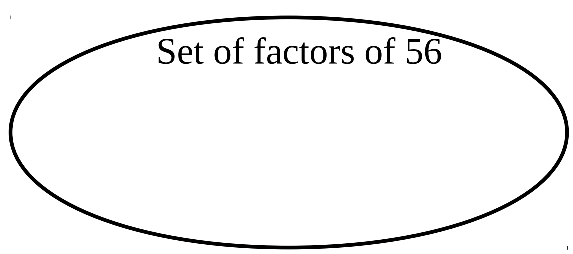
Factors are the numbers we multiply together to get another number. Factors divide the number evenly.

56 = 7 × 8

Factors: 7 and 8

Example: factors of 56

56 : 2 = 28	56 : 14 = 4
56 : 4 = 14	56 : 28 = 2
56 : 8 = 7	56 : 1 = 56
56 : 7 = 8	56 : 56 = 1



A **Prime Number** has only two factor: one and itself.

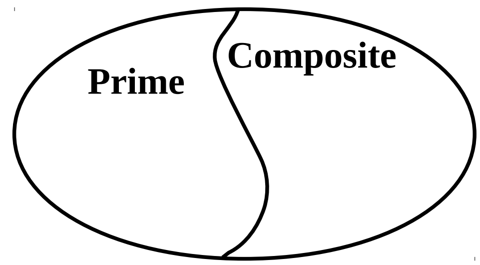
5 Sort the following numbers into the Venn Diagram. List at least one of the factors for each number. DO NOT use trivial factors for composite numbers.

S = {3, 4, 5, 6, 7, 8, 9, 10}

3 : ___ = ___   4 : ___ = ___   5 : ___ = ___

6 : ___ = ___   7 : ___ = ___   8 : ___ = ___

9 : ___ = ___   10 : __ = ___



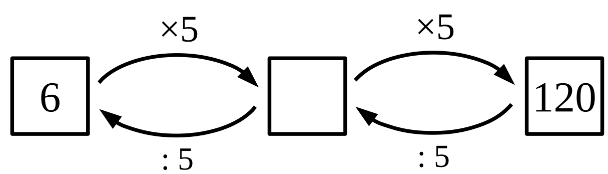
6 Which numbers represented as products of several factors below?

$3 \times 2 \times 2 =$ $7 \times 3 \times 2 =$ $3 \times 5 \times 4 \times 2 =$

$5 \times 2 \times 2 =$ $6 \times 5 \times 3 =$ $3 \times 5 \times 4 \times 10 =$

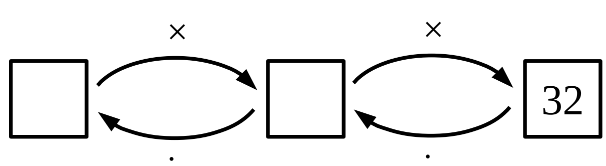
Connection between factors and operations.

$6 \times 5 \times 4 = 120$

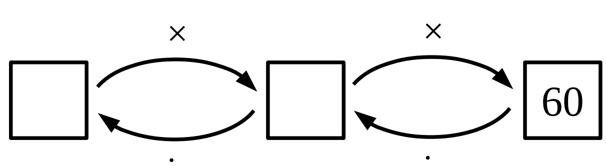


7 Present the following products as sequences of operations:

$32 = 2 \times 4 \times$ ___



$60 =$ ___ $\times 5 \times$ ___

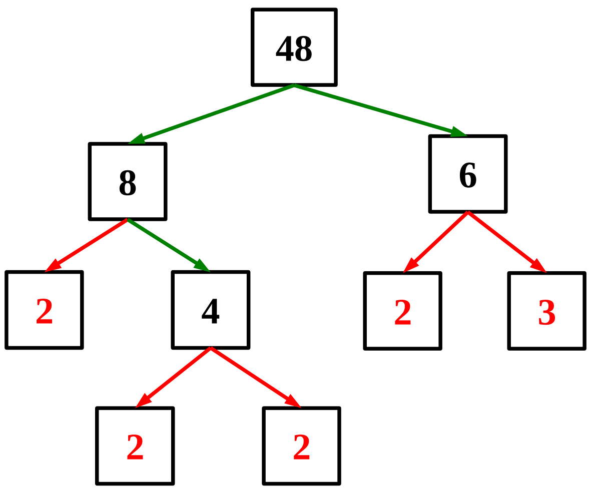


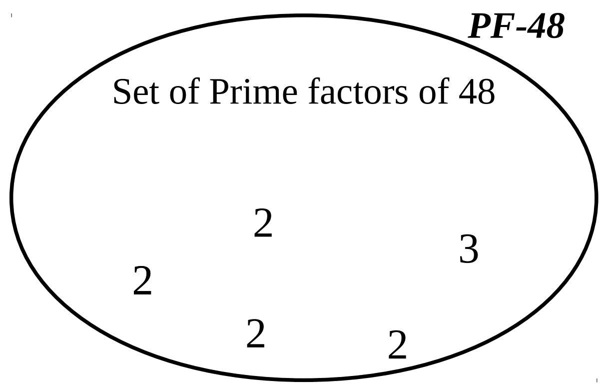
8 Write the result without cumbersome calculations:

128 × 54 : 54 =	329 × 21 : 21 =	29 × 7 : 7 =
56 × 29 : 56 =	71 × 127 : 71 =	562 × 13 : 562 =
2 × 272 × 4 : 272 =	4 × 4 × 319 : 319 =	97 × 4 × 5 : 97 =

Some factors are prime numbers; some are not.
Factors that are prime numbers are called **Prime Factors**

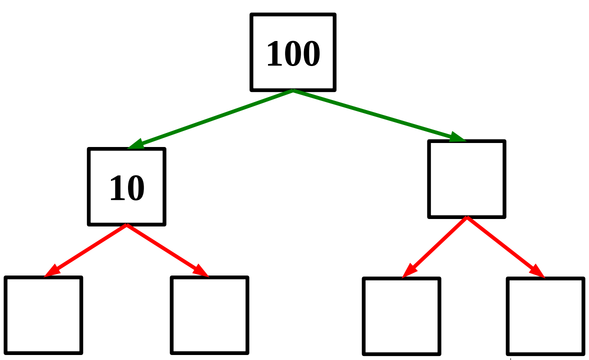
9 Analyze a tree of factors for number 48.

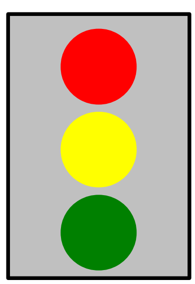


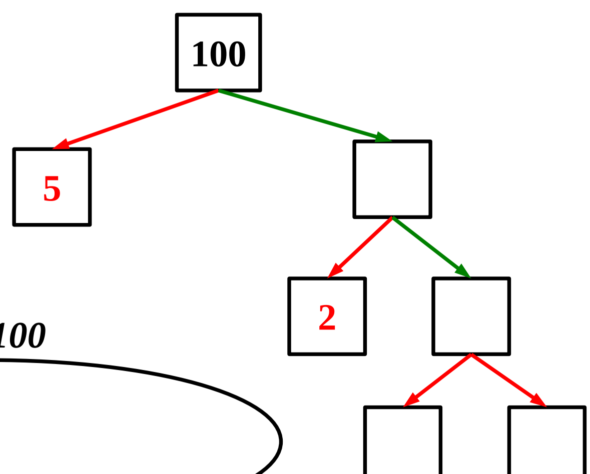


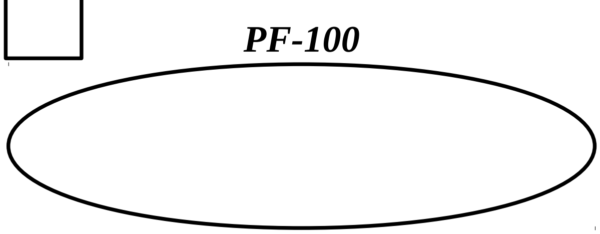
48 = 2 × 2 × 2 × 2 × 3

10 Depending on the first step the view of you tree might be different. See how the tree depends on the first step:



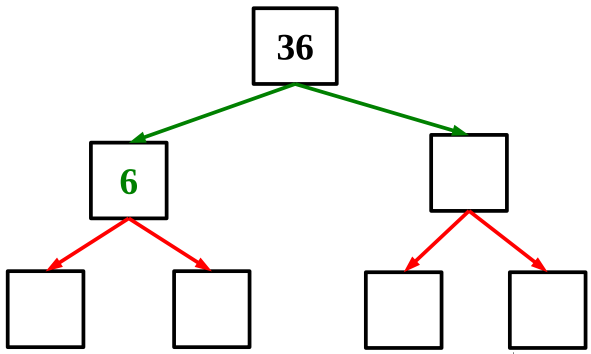


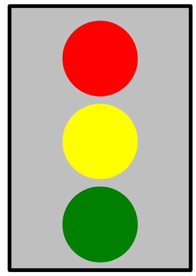


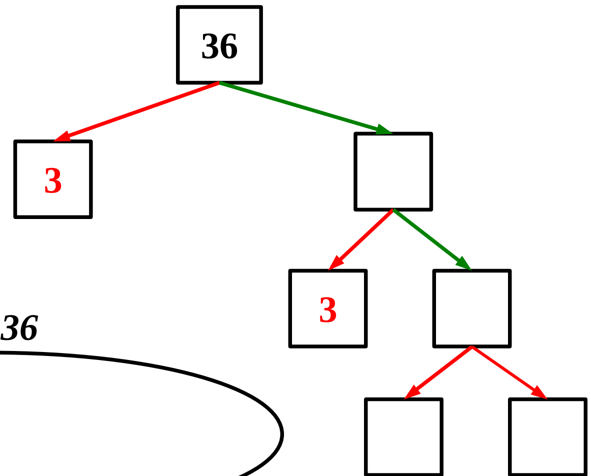


100 = __ × __ ×__ ×__

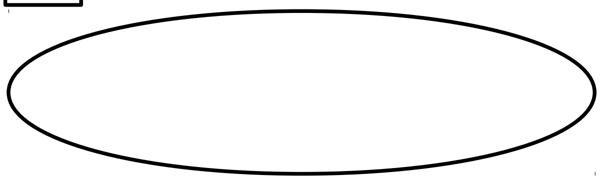
11 Compare different factor trees for the composite numbers below. Do various trees produce different sets of prime factors?



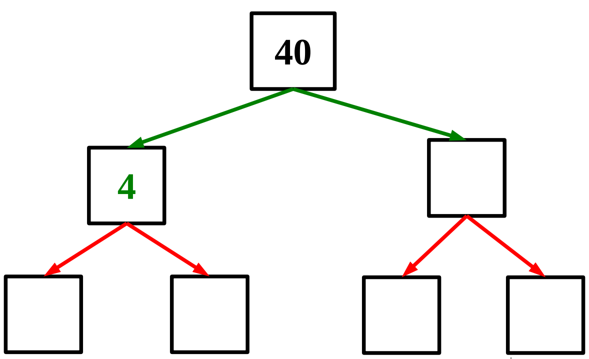


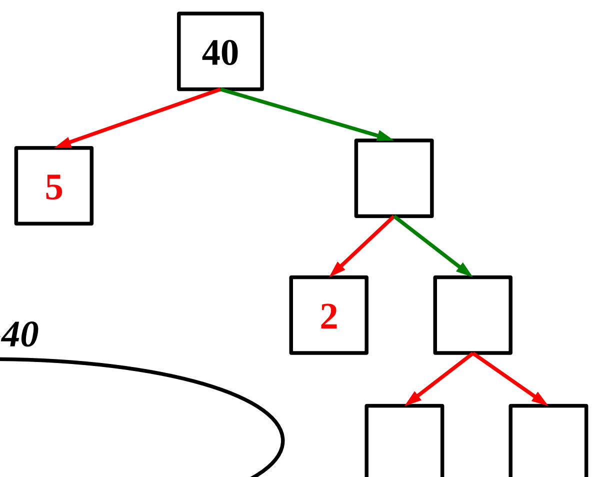


PF-36

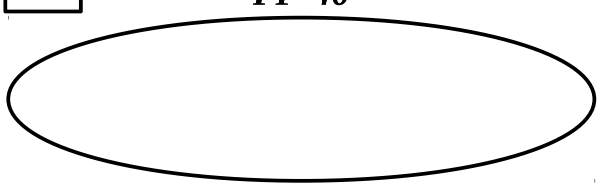


36 = __ × __ ×__ ×__





PF-40



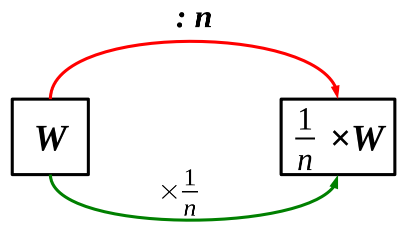
40 = __ × __ ×__ ×__

Every number can be represented as a product of prime factors in a **unique** way.

This unique set of prime factors of the number is called its **Prime Factorization**.

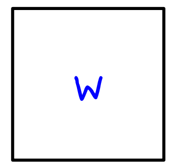
Fraction of a number.

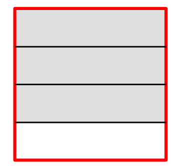
Reminder: to find one *n-th* of a number one has to multiply this number by $\frac{1}{n}$ or divide the number by n:

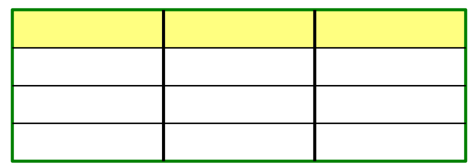


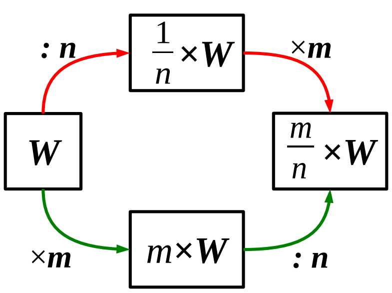
For example: $60 \times \frac{1}{4} = 60 : 4 = 15$

To find a random fraction $\frac{m}{n}$ of a number ***W*** its $\frac{1}{n}$ fraction has to be taken ***m*** times:









$\frac{m}{n}$ fraction of a number ***W*** equals the $\frac{1}{n}$ fraction of the number ***W*** × ***m***

12 Calculate:

$60 \times \frac{1}{3} = 60 : 3 =$ $\quad$ $90 \times \frac{1}{3} = 90 : 3 =$ $\quad$ $15 \times \frac{1}{3} = 15 : 3 =$

$60 \times \frac{2}{3} = 60 : 3 \times 2 =$ $\quad$ $20 \times \frac{3}{4} = 20 : 4 \times 3 =$ $\quad$ $25 \times \frac{2}{5} = 25 : 5 \times 2 =$

$12 \times \frac{5}{6} = 12 \times 5 : 6 =$ $\quad$ $14 \times \frac{3}{7} = 14 : 7 \times 3 =$ $\quad$ $8 \times \frac{3}{4} = 8 \times 3 : 4 =$

$20 \times \frac{2}{5} = 20 : \square \times \square =$ $\quad$ $12 \times \frac{3}{4} = 12 \times \square : \square =$ $\quad$ $6 \times \frac{2}{3} = 6 : \square \times \square =$